

No Calculator

3

What are the solutions of the quadratic equation $4x^2 - 8x - 12 = 0$?

- A) $x = -1$ and $x = -3$
- B) $x = -1$ and $x = 3$
- C) $x = 1$ and $x = -3$
- D) $x = 1$ and $x = 3$

4

Which of the following is an example of a function whose graph in the xy -plane has no x -intercepts?

- A) A linear function whose rate of change is not zero
- B) A quadratic function with real zeros
- C) A quadratic function with no real zeros
- D) A cubic polynomial with at least one real zero

5

$$\sqrt{k+2} - x = 0$$

In the equation above, k is a constant. If $x = 9$, what is the value of k ?

- A) 1
- B) 7
- C) 16
- D) 79

6

Which of the following is equivalent to the sum of the expressions $a^2 - 1$ and $a + 1$?

- A) $a^2 + a$
- B) $a^3 - 1$
- C) $2a^2$
- D) a^3

9

$$\begin{aligned} y &= x^2 \\ 2y + 6 &= 2(x + 3) \end{aligned}$$

If (x, y) is a solution of the system of equations above and $x > 0$, what is the value of xy ?

- A) 1
- B) 2
- C) 3
- D) 9

10

If $a^2 + b^2 = z$ and $ab = y$, which of the following is equivalent to $4z + 8y$?

- A) $(a + 2b)^2$
- B) $(2a + 2b)^2$
- C) $(4a + 4b)^2$
- D) $(4a + 8b)^2$

12

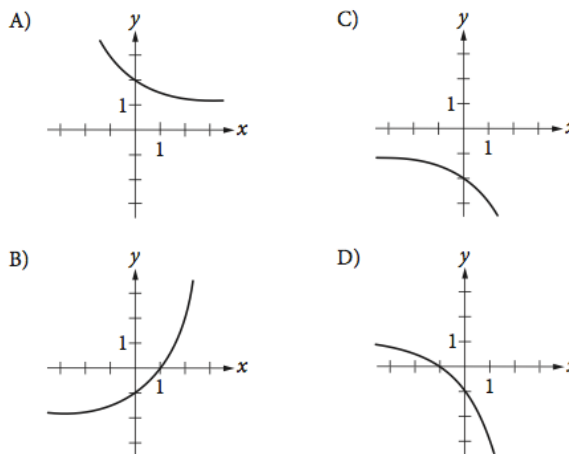
Which of the following is equivalent to $9^{\frac{3}{4}}$?

- A) $\sqrt[3]{9}$
- B) $\sqrt[4]{9}$
- C) $\sqrt{3}$
- D) $3\sqrt{3}$

14

$$f(x) = 2^x + 1$$

The function f is defined by the equation above. Which of the following is the graph of $y = -f(x)$ in the xy -plane?



19

$$\frac{2x+6}{(x+2)^2} - \frac{2}{x+2}$$

The expression above is equivalent to $\frac{a}{(x+2)^2}$,

where a is a positive constant and $x \neq -2$.

What is the value of a ?

8

Which of the following is an equivalent form of $(1.5x - 2.4)^2 - (5.2x^2 - 6.4)$?

- A) $-2.2x^2 + 1.6$
- B) $-2.2x^2 + 11.2$
- C) $-2.95x^2 - 7.2x + 12.16$
- D) $-2.95x^2 - 7.2x + 0.64$

10

The density d of an object is found by dividing the mass m of the object by its volume V . Which of the following equations gives the mass m in terms of d and V ?

- A) $m = dV$
- B) $m = \frac{d}{V}$
- C) $m = \frac{V}{d}$
- D) $m = V + d$

21

$$\frac{a - b}{a} = c$$

In the equation above, if a is negative and b is positive, which of the following must be true?

- A) $c > 1$
- B) $c = 1$
- C) $c = -1$
- D) $c < -1$

26

The surface area of a cube is $6\left(\frac{a}{4}\right)^2$, where a is a positive constant. Which of the following gives the perimeter of one face of the cube?

- A) $\frac{a}{4}$
- B) a
- C) $4a$
- D) $6a$

30

$$y = x^2 - a$$

In the equation above, a is a positive constant and the graph of the equation in the xy -plane is a parabola. Which of the following is an equivalent form of the equation?

- A) $y = (x + a)(x - a)$
- B) $y = (x + \sqrt{a})(x - \sqrt{a})$
- C) $y = \left(x + \frac{a}{2}\right)\left(x - \frac{a}{2}\right)$
- D) $y = (x + a)^2$

34

In the xy -plane, the point $(2, 5)$ lies on the graph of the function f . If $f(x) = k - x^2$, where k is a constant, what is the value of k ?

35

A landscaper is designing a rectangular garden. The length of the garden is to be 5 feet longer than the width. If the area of the garden will be 104 square feet, what will be the length, in feet, of the garden?